

## CERTIFICATION

|         |         |             |                      |
|---------|---------|-------------|----------------------|
| SDG No: | 1701454 | Laboratory: | Eurofins, Folsom, CA |
| Site:   | BMSMC   | Matrix:     | Air                  |

**SUMMARY:** Air samples (Table 1) were collected on the BMSMC facility. The BMSMC facility is located in Humacao, PR. Samples were taken January 29, 2017 and were analyzed in Eurofins Laboratory of Folsom, California that reported the data under SDG No.: 1701454. The sample results were assessed according to USEPA the documents described in the following order of precedence: QC criteria from "Compendium Method TO-17. Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Active Sampling Onto Sorbent Tubes (modified), January, 1999"; In addition the following guideline is employed for set up of the GC/MS analytical system including column selection, MS tune requirements, calibration protocols, etc., as per TO-17 method requirements: USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #6. June, 2014). The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The data sample summary form shows analyte results that were qualified.

In summary, the results are valid and can be used for decision making purposes.

Table 1. Samples analyzed and analysis performed

| SAMPLE ID   | SAMPLE DESCRIPTION | MATRIX | ANALYSIS PERFORMED |
|-------------|--------------------|--------|--------------------|
| 1701454-01A | B1315AA-012817     | Air    | Naphthalene        |
| 1701454-02A | B13IA-1-012817     | Air    | Naphthalene        |
| 1701454-03A | B13IA-3-012817     | Air    | Naphthalene        |
| 1701454-04A | B13IA-2-012817     | Air    | Naphthalene        |
| 1701454-05A | B13IA-2DUP-012817  | Air    | Naphthalene        |
| 1701454-06A | B13SS-1-012917     | Air    | Naphthalene        |
| 1701454-07A | B13SS-2-012917     | Air    | Naphthalene        |
| 1701454-08A | B13SS-2DUP-012917  | Air    | Naphthalene        |
| 1701454-09A | B13SS-3-012917     | Air    | Naphthalene        |
| 1701454-10A | B15S-1-012917      | Air    | Naphthalene        |
| 1701454-11A | B15S-1DUP-012917   | Air    | Naphthalene        |
| 1701454-12A | B15FB-012917       | Air    | Naphthalene        |
| 1701454-13A | B15IA-1DUP-012817  | Air    | Naphthalene        |
| 1701454-14A | B15IA-1-012817     | Air    | Naphthalene        |

Reviewer Name:

Rafael Infante  
Chemist License 1888

Signature:

*Rafael Infante*

Date:

March 18, 2017





## Air Toxics

Client Sample ID: B1315AA-012817

Lab ID#: 1701454R1-01A

EPA METHOD TO-17

|              |           |                                    |   |
|--------------|-----------|------------------------------------|---|
| File Name:   | 6013112R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 12:15:00 AM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 03:53 PM |   |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.058                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 17.3  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 92        | 50-150           |





## Air Toxics

Client Sample ID: B131A-1-012817

Lab ID#: 1701454R1-02A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013113R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 2:45:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 04:33 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.061                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 16.3  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 92        | 50-150           |





## Air Toxics

Client Sample ID: B13IA-3-012817

Lab ID#: 1701454R1-03A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013114R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 2:52:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 05:13 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.059                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 17.0  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 95        | 50-150           |





## Air Toxics

Client Sample ID: B131A-2-012817

Lab ID#: 1701454R1-04A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013115R1 | Date of Extraction: N/A            | Date of Collection: 1/29/17 3:08:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 05:53 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.060                 | 0.61 J         | 0.036 J           |

Air Sample Volume(L): 16.8

J = Estimated value.

Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 92        | 50-150           |





## Air Toxics

Client Sample ID: B131A-2DUP-012817

Lab ID#: 1701454R1-05A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013116R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 3:08:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 06:33 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.060                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 16.8  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 103       | 50-150           |





## Air Toxics

Client Sample ID: B13SS-1-012917

Lab ID#: 1701454R1-06A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013117R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 3:17:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 07:13 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | Not Detected   | Not Detected      |

Air Sample Volume(L): 0.400  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 96        | 50-150           |







## Air Toxics

Client Sample ID: B13SS-2-012917

Lab ID#: 1701454R1-07A

EPA METHOD TO-17

File Name: 6013118R1 Date of Extraction: N/A Date of Collection: 1/29/17 4:05:00 PM  
Dil. Factor: 1.00 Date of Analysis: 1/31/17 07:52 PM

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | Not Detected   | Not Detected      |

Air Sample Volume(L): 0.400  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 93        | 50-150           |





## Air Toxics

Client Sample ID: B13SS-2DUP-012917

Lab ID#: 1701454R1-08A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013119R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 4:01:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 08:32 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | 0.86 J         | 2.2 J             |

Air Sample Volume(L): 0.400

J = Estimated value.

Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 104       | 50-150           |





## Air Toxics

Client Sample ID: B13SS-3-012917

Lab ID#: 1701454R1-09A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013120R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 3:41:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 09:11 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | Not Detected   | Not Detected      |

Air Sample Volume(L): 0.400  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 94        | 50-150           |





## Air Toxics

Client Sample ID: B15S-1-012917

Lab ID#: 1701454R1-10A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013121R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 5:37:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 09:51 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | 0.83 J         | 2.1 J             |

Air Sample Volume(L): 0.400

J = Estimated value.

Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 96        | 50-150           |





## Air Toxics

Client Sample ID: B15SS-1DUP-012917

Lab ID#: 1701454R1-11A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013122R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 5:43:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 10:31 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 2.5                   | 0.47 J         | 1.2 J             |

Air Sample Volume(L): 0.400

J = Estimated value.

Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 92        | 50-150           |





## Air Toxics

Client Sample ID: B15FB-012917

Lab ID#: 1701454R1-12A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013111R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 5:35:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 03:13 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.058                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 17.3  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 72        | 50-150           |





## Air Toxics

Client Sample ID: B151A-1DUP-012817

Lab ID#: 1701454R1-13A

EPA METHOD TO-17

File Name: 6013124R1 Date of Extraction: N/A Date of Collection: 1/29/17 3:50:00 PM  
Dil. Factor: 1.00 Date of Analysis: 1/31/17 11:10 PM

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.059                 | Not Detected   | Not Detected      |

Air Sample Volume(L): 17.0  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 101       | 50-150           |





## Air Toxics

Client Sample ID: B15IA-1-012817

Lab ID#: 1701454R1-14A

EPA METHOD TO-17

|              |           |                                    |  |
|--------------|-----------|------------------------------------|--|
| File Name:   | 6013125R1 | Date of Extraction: NA             | Date of Collection: 1/29/17 3:50:00 PM |
| Dil. Factor: | 1.00      | Date of Analysis: 1/31/17 11:50 PM |  |

| Compound    | Rpt. Limit<br>(ng) | Rpt. Limit<br>(ug/m3) | Amount<br>(ng) | Amount<br>(ug/m3) |
|-------------|--------------------|-----------------------|----------------|-------------------|
| Naphthalene | 1.0                | 0.060                 | 1.2            | 0.070             |

Air Sample Volume(L): 16.8  
Container Type: TO-17 VI Tube

| Surrogates     | %Recovery | Method<br>Limits |
|----------------|-----------|------------------|
| Naphthalene-d8 | 89        | 50-150           |







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## Chain-of-Custody Record

TO-17

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|   |                   |                |                    |   |          |   |              |   |  |
|---|-------------------|----------------|--------------------|---|----------|---|--------------|---|--|
| Project Manager: Terry Taylor<br>Company: Anderson Mulholland & Associates, Inc.<br>Address: 2700 Winchester, Suite 41 City: Purchase State: NY Zip: 10577<br>Phone: 914-251-0400, ext. 309, FAX: |                   |                |                    | Project Information:<br>P.O. #<br>Project #<br>Project Name BMS VI Invest.<br>Buildings 8, 13, 15, 18, and 30                   |          | Turn Around Time:<br><input checked="" type="checkbox"/> Normal<br><input type="checkbox"/> Rush<br>Specify |              | Reporting Units:<br><input type="checkbox"/> ppmv<br><input type="checkbox"/> ppbv<br><input checked="" type="checkbox"/> ug/m3<br><input type="checkbox"/> mg/m3 |  |
| Collected By (print and sign): <i>David Lindstrand</i>  |                   |                |                    | Analysts Requested  |          |   |              |   |  |
| Lab I.D.  | Field Sample I.D. | Tube/Cartridge | Date of Collection | Start Time  | End Time | Duration  | Final Volume |   |  |
| 01A   | B13ISA-012817     | 147253         | 1/29/17            | 1615  | 0015     | 40 min  | 5.3 L        | Naphthalene   |  |
| 02A   | B13IA-1-012817    | 152217         | 1/29/17            | 1445  | 1445     | 40 min  | 16.3         | Naphthalene   |  |
| 03A   | B13IA-3-012817    | 153670         | 1/29/17            | 1452  | 1452     | 40 min  | 17.0         | NAP   |  |
| 04A   | B13IA-2-012817    | 147082         | 1/29/17            | 1504  | 1508     | 40 min  | 16.8         | Naphthalene   |  |
| 05A   | B13IA-2DUP-012817 | 144403         | 1/29/17            | 1508  | 1508     | 40 min  | 16.8         | Naphthalene   |  |
| 06A   | B13SS-1-012917    | 149600         | 1/29/17            | 1514  | 1517     | 3 min   | 0.40         | Naphthalene   |  |
| 07A   | B13SS-2-012917    | 145582         | 1/29/17            | 1602  | 1605     | 3 min   | 0.40         | Naphthalene   |  |
| 08A   | B13SS-2DUP-012917 | 149756         | 1/29/17            | 1558  | 1601     | 3 min   | 0.40         | Naphthalene   |  |
| 09A   | B13SS-3-012917    | 137150         | 1/29/17            | 1538  | 1541     | 3 min   | 0.40         | Naphthalene   |  |
| 10A   | B15SS-1-012917    | 160540         | 1/29/17            | 1734  | 1737     | 3 min   | 0.40         | Naphthalene   |  |
| Relinquished By (Signature) Date/Time<br><i>David Lindstrand</i> 30 Jan 17 1200 Fed Ex  |                   |                |                    | Pump Calibration Information<br>Pre-test Flow Rate: 35 ml/min<br>Post-test Flow Rate: 37 ml/min<br>Average Flow Rate: 36 ml/min |          |   |              | Notes:  |  |
| Relinquished By (Signature) Date/Time<br><i>David Lindstrand</i> 30 Jan 17 1200 Fed Ex  |                   |                |                    | Pre-test Flow Rate: 35 ml/min<br>Post-test Flow Rate: 37 ml/min<br>Average Flow Rate: 36 ml/min                                 |          |   |              |   |  |
| Relinquished By (Signature) Date/Time<br><i>David Lindstrand</i> 30 Jan 17 1200 Fed Ex  |                   |                |                    | Pre-test Flow Rate: 35 ml/min<br>Post-test Flow Rate: 37 ml/min<br>Average Flow Rate: 36 ml/min                                 |          |   |              |   |  |
| Shipper Name<br><i>FedEx</i>  |                   |                |                    | Air Bill #<br><i>KK</i>   |          | Temp °C<br><i>12.9°C</i>  |              | Condition<br><i>SDR</i>   |  |
| Custody Seals<br><i>Yes</i>   |                   |                |                    | No<br><i>No</i>   |          | Work Order #<br><i>1701454</i>  |              |   |  |

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## Chain-of-Custody Record

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| <b>Project Manager:</b> Terry Taylor<br><b>Company:</b> Anderson Mulholland & Associates, Inc.<br><b>Address:</b> 2700 Winchester, Suite 411 City: Purchase State: NY Zip: 10577<br><b>Phone:</b> 914-251-0400, ext. 309 FAX: |                    |   |                    | <b>Project Information:</b><br><b>P.O. #</b><br><b>Project #</b><br><b>Project Name</b> BMS VI Invest. Buildings 8, 13, 15, 18, and 30 |          |                      |              | <b>Turn Around Time:</b><br><input checked="" type="checkbox"/> Normal<br><input type="checkbox"/> Rush<br>Specify |  | <b>Reporting Units:</b><br><input type="checkbox"/> ppmv<br><input checked="" type="checkbox"/> ppbv<br><input checked="" type="checkbox"/> ug/m3<br><input type="checkbox"/> mg/m3 |  |
|---|--------------------|---|--------------------|--|----------|----------------------|--------------|--|--|---|--|
| <b>Collected By (print and sign):</b> <i>David Lindstrand</i>   |                    |   |                    |  |          |                      |              |  |  |   |  |
| Lab I.D.  | Field Sample I.D.  | Tubel Cartridge   | Date of Collection | Start Time   | End Time | Duration             | Final Volume | Analysis Requested   |  |   |  |
| 11A   | BISSE-3-DUP-012017 | 155252  | 1/25/17            | 1740   | 1743     | 3 min                | 0.40         | Naphthalene  |  |   |  |
| 12A   | BISFB-012517       | 143458  | 1/25/17            | 1735   | 1735     | —                    | —            | Naphthalene  |  |   |  |
| 13A   | BISIA-1-DUP-012817 | 140142  | 1/25/17            | 1550   | 1550     | 480 min              | 17.0         | Naphthalene  |  |   |  |
| 14A   | BISIA-1-012817     | 146189  | 1/25/17            | 1550   | 1550     | 480 min              | 16.8         | Naphthalene  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
|   |                    |   |                    |  |          |                      |              |  |  |   |  |
| <b>Relinquished By (Signature) Date/Time</b><br><i>David Lindstrand</i> 30 Jan 17 1700 FedEx  |                    | <b>Received By (Signature) Date/Time</b><br>1/31/17 BATL 1/31/17 1022 |                    | <b>Pump Calibration Information</b><br>Pre-test Flow Rate:<br>Post-test Flow Rate:<br>Average Flow Rate:                               |          | <b>Notes:</b>        |              |  |  |   |  |
| <b>Relinquished By (Signature) Date/Time</b><br>[Signature]   |                    | <b>Received By (Signature) Date/Time</b><br>[Signature]               |                    | <b>Temp °C</b> 12.9°C  |          | <b>Condition</b> 5DR |              | <b>Custody Seals</b> Yes No <u>None</u>  |  | <b>Work Order #</b> 1701454   |  |
| <b>Shipper Name</b> FedEx   |                    | <b>Air Bill #</b> KK  |                    | <b>Temp °C</b> 12.9°C  |          | <b>Condition</b> 5DR |              | <b>Custody Seals</b> Yes No <u>None</u>  |  | <b>Work Order #</b> 1701454   |  |
| <b>Lab Use Only</b>   |                    |   |                    |  |          |                      |              |  |  |   |  |

## EXECUTIVE NARRATIVE

SDG No: **1701454** Laboratory: **Eurofins, Folsom, CA**  
Analysis: **TO-17** Number of Samples: **14**  
Location:

**SUMMARY:** Fourteen (14) samples were analyzed for the naphthalene in ambient air following Compendium Method TO-17. The sample results were assessed according to USEPA the documents described in the following order of precedence: QC criteria from "Compendium Method TO-17. Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Active Sampling Onto Sorbent Tubes (modified), January, 1999"; In addition the following guideline is employed for the evaluation of the set-up of the GC/MS analytical system including column selection, MS tune requirements, calibration protocols, etc., as per TO-17 method requirements: USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #6. June, 2014). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

**Critical issues:** **None**  
**Major:** **None**  
**Minor:** **None**

**Critical findings:** **None**  
**Major findings:** **None**  
**Minor findings:** **1.** Laboratory/field duplicates analyzed as part of this data set. Laboratory duplicate were within method performance criteria.  
  
Field duplicate RPD within method performance criteria except for the cases described in the Data Review Worksheet. No action taken sample/duplicate concentration < 5 x SQL.

**COMMENTS:** Results are valid and can be used for decision making purposes.

**Reviewers Name:** Rafael Infante  
Chemist License 1888

**Signature:**



**Date:**

March 18, 2017

# NAPHTHALENE DATA SAMPLE SUMMARY

METHOD:

TO-17

## NAPHTHALENE - TO 17

| Sample ID     | Date      | Results | Units             | Dilution Factor | Lab Flag | Validation | Reportable |
|---------------|-----------|---------|-------------------|-----------------|----------|------------|------------|
| 1701454R1-01A | 1/29/2017 | 0.058   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-02A | 1/29/2017 | 0.061   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-03A | 1/29/2017 | 0.059   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-04A | 1/29/2017 | 0.036   | ug/m <sup>3</sup> | 1.0             | J        | J          | Yes        |
| 1701454R1-05A | 1/29/2017 | 0.060   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-06A | 1/29/2017 | 2.5     | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-07A | 1/29/2017 | 2.5     | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-08A | 1/29/2017 | 2.5     | ug/m <sup>3</sup> | 1.0             | J        | J          | Yes        |
| 1701454R1-09A | 1/29/2017 | 2.5     | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-10A | 1/29/2017 | 2.1     | ug/m <sup>3</sup> | 1.0             | J        | J          | Yes        |
| 1701454R1-11A | 1/29/2017 | 1.2     | ug/m <sup>3</sup> | 1.0             | J        | J          | Yes        |
| 1701454R1-12A | 1/29/2017 | 0.058   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-13A | 1/29/2017 | 0.059   | ug/m <sup>3</sup> | 1.0             | -        | U          | Yes        |
| 1701454R1-14A | 1/29/2017 | 0.070   | ug/m <sup>3</sup> | 1.0             | -        | -          | Yes        |

# DATA REVIEW WORKSHEETS

Project Number: 1701454

Date: 01/29/2017

## REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA the documents described in the following order of precedence: QC criteria from "Compendium Method TO-17. Determination of Volatile Organic Compounds (VOCs) In Ambient Air Using Active Sampling Onto Sorbent Tubes (modified), January, 1999"; In addition the following guideline is employed for the evaluation of the set-up of the GC/MS analytical system including column selection, MS tune requirements, calibration protocols, etc., as per TO-17 method requirements: USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #6. June, 2014). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Eurofins - Air Toxics data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: 1701454

Sample matrix: Air

No. of Samples: 14

Trip blank No.: -

Field blank No.: B15FB-012917

Equipment blank No.: -

Field duplicate No.: B13IA-2-012817/B13IA-2DUP-012817; B13SS-2-012917/B13SS-2DUP-012917; B15S-1-012917/B15S-1DUP-012917; B15IA-1-012817/B15IA-1DUP-012817

☒ Data Completeness

☒ Laboratory Control Spikes

☒ Holding Times

☒ Field Duplicates

☒ GC/MS Tuning

☒ Calibrations

☒ Internal Standard Performance

☒ Compound Identifications

☒ Blanks

☒ Compound Quantitation

☒ Surrogate Recoveries

☒ Quantitation Limits

Overall Comments: Naphthalene by method TO-17 (modified) detection by full scan GC/MS

### Definition of Qualifiers:

J- Estimated results

U- Compound not detected

R- Rejected data

UJ- Estimated nondetect

Reviewer: Rafael Dufaut

Date: 03/18/2017

## DATA REVIEW WORKSHEETS

## DATA COMPLETENESS

### MISSING INFORMATION

DATE LAB. CONTACTEDDATE RECEIVED[illegible]

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID   | DATE SAMPLED | DATE ANALYZED | > 10% difference in sample flow rate (beginning/end) | ACTION |
|---|--------------|---------------|--|--------|
|   |              |               |  |        |
|   |              |               |  |        |
| All samples analyzed within the recommended method holding time. Samples received in good conditions and no receiving discrepancies were observed except the cases described in this document. A Temperature Blank was included with the shipment. Temperature was measured and was not within 4±2 °C. Coolant in the form of blue ice was present. Analysis proceeded; no action taken professional judgment. Pump calibration information included in data package. |              |               |  |        |
|   |              |               |  |        |
|   |              |               |  |        |
|   |              |               |  |        |

### Criteria

Samples should be refrigerated at <4°C in a clean environment during storage and analyzed within 30 days of sample collection (within one week for limonene, carene, *bis*-chloromethyl ether and labile sulfur or nitrogen containing volatiles). Samples taken on tubes containing multiple sorbent beds should be analyzed as soon as possible after sampling unless it is know in advance that storage will not cause significant sample recovery errors.

Receiving temperature: 12°C, 9°C

### Actions

If holding times are exceeded use professional judgment to qualify positive results and non-detects.

### Performance Criteria for the Monitoring Pump

Sampling pump errors can normally be presumed to be in the order of 5% (8). If the pump sampling flow rate measured at the end of sample collection varies more than 10% from that measured at the beginning of sample collection, then that sample is invalidated.

## GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits. The following actions from the TO-15 compendium method are employed.

**Gas Chromatograph/Mass Spectrometer (GC/MS) Instrument Performance Check**

**Action:**

**NOTES:** This requirement does not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique.

All mass spectrometer instrument conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the method specifications are contrary to the Quality Assurance (QA) objectives, and are therefore unacceptable.

**NOTES:** No data should be qualified based on BFB or DFTTP failure. Instances of this should be noted in the narrative.

All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

1. If samples are analyzed without a preceding valid instrument performance check, qualify all data in those samples as unusable (R).
2. If the laboratory has made minor transcription errors which do not significantly affect the data, the data reviewer should make the necessary corrections on a copy of the form.
3. If the laboratory has failed to provide the correct forms or has made significant transcription or calculation errors, the Region's designated representative should contact the laboratory and request corrected data. If the information is not available, the reviewer must use professional judgment to assess the data and notify the Project Officer (PO).
4. If ion abundance criteria are not met, professional judgment may be applied to determine to what extent the data may be utilized. When applying professional judgment to this topic, the most important factors to consider are the empirical results that are relatively insensitive to location on the chromatographic profile and the type of instrumentation. Therefore, the critical ion abundance criteria for BFB are the m/z 95/96, 174/175, 174/176, and 176/177 ratios. The relative abundances of m/z 50 and 75 are of lower importance. This issue is more critical for Tentatively Identified Compounds (TICs) than for target analytes.
5. Note, in the Data Review Narrative, decisions to use analytical data associated with BFB instrument performance check failures (not meeting contract requirements).
6. If the reviewer has reason to believe that instrument performance check criteria were achieved using techniques other than those described in the Compendium method TO-15 entitled "Determination Of Volatile Organic Compounds(VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry(GC/MS)", section 10.4, obtain additional information on the instrument performance checks. If the techniques employed are found to be at variance with the contract requirements, the performance and procedures of the laboratory may merit evaluation.
7. Use professional judgment to determine whether associated data should be qualified based on the spectrum of the mass calibration compound.



## DATA REVIEW WORKSHEETS

☒ The BFB performance results were reviewed and found to be within the specified criteria.

☒ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:

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---

If mass calibration is in error, all associated data are rejected.

## DATA REVIEW WORKSHEETS

All criteria were met ☒X\_\_\_  
 Criteria were not met  
 and/or see below \_\_\_\_\_

### CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data. The calibration criteria and appropriate actions from the compendium method TO-15 are employed.

Date of initial calibration: \_\_\_\_\_01/27/17\_\_\_\_\_  
 Dates of continuing calibration: \_\_\_\_\_01/31/17\_\_\_\_\_  
 Instrument ID numbers: \_\_\_\_\_MSD-6\_\_\_\_\_  
 Matrix/Level: \_\_\_\_\_Air/low\_\_\_\_\_

| DATE  | LAB ID# | FILE | CRITERIA OUT<br>RFs, %RSD, %D, r | COMPOUND | SAMPLES<br>AFFECTED |
|---|---------|------|----------------------------------|----------|---------------------|
|   |         |      |                                  |          |                     |
| Initial and continuing calibrations meet method specific requirements. Initial calibration retention times meet method specific requirements. |         |      |                                  |          |                     |
|   |         |      |                                  |          |                     |
|   |         |      |                                  |          |                     |
|   |         |      |                                  |          |                     |
|   |         |      |                                  |          |                     |

The following criteria apply:

**Table 5. Initial Calibration Actions for TO-15 Analyses**

| Criteria for TO-15 Analysis   | Action                                    |   |
|---|---|---|
|   | Detected<br>Associated<br>Compounds       | Non-Detected<br>Associated<br>Compounds |
| RRF < 0.010 (poor response volatile target compounds, Table 4)<br>RRF < 0.050 (all other volatile target compounds)                           | J (based on mass spectral identification) | R                                       |
| RRF > 0.010 (poor response volatile target compounds, Table 4)<br>RRF > 0.050 (all other volatile target compounds)                           | No qualification                          |   |
| % RSD > 40.0 or < -40.0 (poor response volatile target compounds, Table 4)<br>% RSD > 30.0 or < -30.0 (all other Volatile target compounds)   | No qualification                          |   |
| % RSD < 40.0 and > -40.0 (poor response volatile target compounds, Table 4)<br>% RSD < 30.0 and > -30.0 (all other volatile target compounds) | J   | Use professional judgment               |

DATA REVIEW WORKSHEETS

**Table 6. Continuing Calibration Verification (CCV) Actions for TO-15 Analyses**

| Criteria for CCV  | Action                                    |                                   |
|---|---|-----------------------------------|
|   | Detected Associated Compounds             | Non-Detected Associated Compounds |
| RRF < 0.010 (poor response volatile target compounds, Table 4)<br>RRF < 0.050 (all other volatile target compounds)                     | J (based on mass spectral identification) | R                                 |
| RRF > 0.010 (poor response volatile target compounds, Table 4)<br>RRF > 0.050 (all other volatile target compounds)                     | No qualification                          |                                   |
| %D > 40.0 or < -40.0 (poor response volatile target compounds, Table 4)<br>%D > 30.0 or < -30.0 (all other Volatile target compounds)   | J   | UJ                                |
| %D < 40.0 and > -40.0 (poor response volatile target compounds, Table 4)<br>%D < 30.0 and > -30.0 (all other volatile target compounds) | No qualification                          |                                   |

If the % D for daily calibration exceeds -90, use professional judgment to see if non-detects need to be qualified as unusable "R"

A separate worksheet should be filled for each initial curve

## DATA REVIEW WORKSHEETS

Table 4. TO 15 Volatile Compounds List\*

| Compound                      | CAS Number      | Synonyms  |
|-------------------------------|-----------------|---|
| Acetone                       | 67-64-1         | Dimethyl ketone; Dimethylformaldehyde; 2-Propanone              |
| Allyl chloride                | 107-05-1        | 3-Chloropropene; 3-Chloroprene                                  |
| Benzene                       | 71-43-2         | Benzol; Benzine   |
| Benzyl chloride               | 100-44-7        | Chloromethylbenzene; alpha-Chlorotoluene                        |
| Bromodichloromethane          | 75-27-4         | Monobromodichloromethane; Methane-bromodichloro                 |
| Bromoethene                   | 593-60-2        | Vinyl bromide; Monobromoethene                                  |
| Bromoform                     | 75-25-2         | Tribromoethane  |
| Bromomethane                  | 74-83-9         | Methyl bromide; Monobromomethane                                |
| 1,3-Butadiene                 | 106-99-0        | Biethylene; Erythrene; Pyrrolyene                               |
| <b>Carbon disulfide</b>       | <b>75-15-0</b>  | <b>Carbon bisulfide; Carbon sulfide</b>                         |
| Carbon tetrachloride          | 56-23-5         | Carbon tet; Tetrachloromethane                                  |
| Chlorobenzene                 | 108-90-7        | Monochlorobenzene; Chlorobenzol; Benzene chloride               |
| <b>Chloroethane</b>           | <b>75-00-3</b>  | <b>Ethyl chloride; Chlorene; Chloryl</b>                        |
| Chloroethene                  | 75-01-4         | Vinyl chloride; Ethylene monochloride                           |
| Chloroform                    | 67-66-3         | Trichloromethane; Methyltrichloride; Methane trichloride        |
| <b>Chloromethane</b>          | <b>74-87-3</b>  | <b>R40; Methyl chloride; Monochloromethane</b>                  |
| Cyclohexane                   | 110-82-7        | Hexamethylene; Hexahydrobenzene; Hexanaphthene                  |
| Dibromochloromethane          | 124-48-1        | Chlorodibromomethane  |
| <b>1,2-Dibromoethane</b>      | <b>106-93-4</b> | <b>EDB; Ethylene dibromide</b>                                  |
| 1,2-Dichlorobenzene           | 95-50-1         | ODB; Chloroben  |
| 1,3-Dichlorobenzene           | 541-73-1        | meta-Dichlorobenzene; m-Phenylenedichloride                     |
| 1,4-Dichlorobenzene           | 106-46-7        | para-Dichlorobenzene; Parazene; Santochlor                      |
| 1,1-Dichloroethane            | 75-34-3         | Ethylidene chloride; Ethylidene dichloride                      |
| 1,2-Dichloroethane            | 107-06-2        | Ethylene dichloride; Glycol dichloride; 1,2-DCA                 |
| 1,1-Dichloroethene            | 75-35-4         | 1,1-DCE; Vinylidene chloride                                    |
| cis-1,2-Dichloroethylene      | 156-59-2        | cis-1,2-DCE; cis-Acetylene dichloride                           |
| trans-1,2-Dichloroethylene    | 156-60-5        | trans-1,2-DCE; trans-Acetylene dichloride                       |
| <b>1,2-Dichloropropane</b>    | <b>78-87-5</b>  | <b>Propylene dichloride; Propylene chloride</b>                 |
| cis-1,3-Dichloropropene       | 10061-01-5      | 1-Propene,1,3-dichloro-,(z)-; cis-1,3-Dichloro-1-Propene        |
| trans-1,3-Dichloropropene     | 10061-02-6      | trans-1,3-Dichloro-1-Propene; trans-1,3-Dichloropropylene       |
| <b>1,4-Dioxane</b>            | <b>123-91-1</b> | <b>Diethylene dioxide; Diethylene ether</b>                     |
| Ethyl acetate                 | 141-78-6        | Acetic acid ethyl ester; Acetic ether                           |
| Ethylbenzene                  | 100-41-4        | Ethylbenzol; Phenylethane                                       |
| 4-Ethyltoluene                | 622-96-8        | 1-Ethyl-4-methyl benzene; p-Methylethylbenzene                  |
| Freon 11 (CCl <sub>3</sub> F) | 75-69-4         | Trichlorofluoromethane; Fluorotrichloromethane; Fluorocarbon 11 |

## DATA REVIEW WORKSHEETS

|  |                |  |
|--|----------------|--|
| Freon 12 (CCl <sub>2</sub> F <sub>2</sub> )                | 75-71-8        | Dichlorodifluoromethane; Fluorocarbon 12   |
| Freon 113 (C <sub>2</sub> Cl <sub>3</sub> F <sub>3</sub> ) | 76-13-1        | 1,1,2-Trichloro-1,2,2-trifluoroethane; Fluorocarbon 113; 1,1,2-Trichlorotrifluoroethane    |
| Freon 114 (C <sub>2</sub> Cl <sub>2</sub> F <sub>4</sub> ) | 76-14-2        | 1,2-Dichlorotetrafluoroethane; Halocarbon 114; 1,2-Dichloro-1,1,2,2-tetrafluoroethane      |
| Heptane  | 142-82-5       | Dipropylmethane; Heptyl hydride  |
| Hexachlorobutadiene  | 87-68-3        | 1,3-Hexachlorobutadiene; Perchlorobutadiene  |
| Hexane   | 110-54-3       | n-Hexane; Hexyl hydride  |
| 2-Hexanone   | 591-78-6       | Methyl butyl ketone; Butyl methyl ketone; Hexan-2-one                                      |
| Isopropyl alcohol  | 67-63-0        | 2-Propanol; Isopropanol  |
| <b>Methylene chloride</b>                                  | <b>75-09-2</b> | <b>Dichloromethane; Methylene dichloride</b>   |
| <b>Methyl ethyl ketone</b>                                 | <b>78-93-3</b> | <b>MEK; 2-Butanone; Ethyl methyl ketone</b>  |
| Methyl isobutyl ketone                                     | 108-10-1       | MIBK; 2-Pentanone; Hexone; Isopropylacetone  |
| Methyl tert-butyl ether                                    | 1634-04-4      | MTBE; 2-Methoxy-2-methylpropane; tert-Butyl methyl ether                                   |
| Propylene  | 115-07-1       | Propene; Methylene   |
| Styrene  | 100-42-5       | Vinylbenzene; Phenylethylene   |
| 1,1,2,2-Tetrachloroethane                                  | 79-34-5        | Tetrachloroethane; Acetylene tetrachloride; Bonoform                                       |
| Tetrachloroethene  | 127-18-4       | PCE; PERC; Perchloroethylene; Ethylene tetrachloride; Carbon bichloride; Carbon dichloride |
| Tetrahydrofuran  | 109-99-9       | Diethylene oxide; Butylene oxide   |
| Toluene  | 108-88-3       | Toluol; Methylbenzene  |
| 1,2,4-Trichlorobenzene                                     | 120-82-1       | 1,2,4-Trichlorobenzol  |
| 1,1,1-Trichloroethane                                      | 71-55-6        | Methyl chloroform; Trichloroethane   |
| 1,1,2-Trichloroethane                                      | 79-00-5        | beta-Trichloroethane; Ethane trichloride; Vinyl trichloride                                |
| Trichloroethene  | 79-01-6        | TCE; Acetylene trichloride; Ethinyl trichloride  |
| 1,2,4-Trimethylbenzene                                     | 95-63-6        | Pseudocumene; Pseudocumol  |
| 1,3,5-Trimethylbenzene                                     | 108-67-8       | Mesitylene; Trimethylbenzol  |
| 2,2,4-Trimethylpentane                                     | 540-84-1       | Iso-octane; Isobutyltrimethylmethane   |
| Vinyl acetate  | 108-05-4       | Acetic acid ethenyl ether; Ethenyl acetate   |
| p-Xylene   | 106-42-3       | p-Methyltoluene; 1,4-dimethylbenzene   |
| m-Xylene   | 108-38-3       | m-Methyltoluene; 1,3-dimethylbenzene   |
| o-Xylene   | 95-47-6        | o-Methyltoluene; 1,2-Dimethylbenzene   |

\*Laboratories use different sets and subsets of analytes on as needed basis.

### NOTES:

Compounds in bold italicized letters may have poor GCMS response. These poor response compounds are evaluated using more relaxed relative response factor criteria as stated below.

**Note:** Naphthalene does not have poor GCMS response. Calibration criteria: RRF > 0.05 and % difference in the continuing calibration verification < 30 %.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below           

### V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

#### Laboratory blanks

| DATE<br>ANALYZED  | LAB ID | LEVEL/<br>MATRIX | COMPOUND | CONCENTRATION<br>UNITS |
|---|--------|------------------|----------|------------------------|
| <u>  All_method_blank_meet_method_specific_criteria  </u> |        |                  |          |                        |
|   |        |                  |          |                        |

#### Field blanks

Field blanks are the same as laboratory blanks except that they are transported to and from the monitoring site, are uncapped and immediately resealed at the monitoring site, but do not actually have air pumped through them. One field blank tube is taken for every ten sampled tubes on a monitoring exercise.

#### Criteria:

If the same profile/pattern of VOCs is observed on the field blanks as on the sampled tubes and if the level of these components is 5% or more of the sampled volatiles, careful attention must be paid to the method of sealing the tubes and other storage procedures in future studies. If the profile of volatiles on the field blanks matches that of the sampled tubes and if the areas of the peaks on the field blank are 10% or more of sampled tube levels, the sampled tube data are invalidated.

| DATE<br>ANALYZED  | LAB ID | LEVEL/<br>MATRIX | COMPOUND | CONCENTRATION<br>UNITS |
|---|--------|------------------|----------|------------------------|
| <u>  No_target_analyte_detected_in_the_field_blank_analyzed_with_this_data_package.  </u> |        |                  |          |                        |
|   |        |                  |          |                        |

**Note:**

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below \_\_\_\_\_

### V B. BLANK ANALYSIS RESULTS (Section 3)

## Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)

ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and  $\leq$  AL, report the compound as not detected (U) at the SQL.

If the concentration is  $\geq$  SQL but  $\leq$  AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately

Compounds qualified “U” for blank contamination are still considered “hits” when qualifying for calibration criteria.

[illegible]

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below         

### SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: solid/aqueous

| SAMPLE ID             | SURROGATE COMPOUND   | ACTION |
|-----------------------|----------------------|--------|
| 1,2-DICHLOROETHANE-d4 | Naphthalene-d8 4-BFB |        |

Surrogate recoveries within laboratory control limits \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QC Limits\* (Air)

LL to UL to 50 to 150 to

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

| QUALITY            | %R < 10% | %R = 10% - LL | %R > UL |
|--------------------|----------|---------------|---------|
| Positive results   | J        | J             | J       |
| Nondetects results | R        | UJ            | Accept  |

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.



## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below         

### VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

#### 1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD?  
 Yes or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

| LCS ID  | COMPOUND | % R | QC LIMIT |
|---|----------|-----|----------|
| LCS/LCSD_(Blank_spike)_analyzed_in_this_data_package;_%_recoveries_and_RPD_____ |          |     |          |
| _____within_laboratory_control_limits._____                                     |          |     |          |
| _____   |          |     |          |
| _____   |          |     |          |
| _____   |          |     |          |

- \* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- \* If QC limits are not available, use limits of 70 – 130 %.

Actions:

**Table 9. LCS/LCSD Actions for TO-15 Analyses**

| Criteria   | Action                        |                                   |
|--|-------------------------------|-----------------------------------|
|  | Detected Associated Compounds | Non-detected Associated Compounds |
| Percent recovery Criteria                            |                               |                                   |
| %R > Upper Acceptance Limit (>130%)                  | J                             | No qualification                  |
| %R in the acceptable range, 70-130%                  | No qualification              |                                   |
| %R < Lower Acceptance Limit (< 70 %)                 | J                             | UJ                                |
| %R < 50%   | J                             | R                                 |
| Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit | No qualification              |                                   |
|  |                               |                                   |
| Relative Percent Difference Criteria                 |                               |                                   |
| % RPD ≤ 25%  | No qualification              |                                   |
| % RPD > 25 %   | J                             | UJ                                |

#### 2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? **Yes** or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

# DATA REVIEW WORKSHEETS

All criteria were met ☒ X  
 Criteria were not met  
 and/or see below \_\_\_\_\_

## IX. LABORATORY/FIELD DUPLICATE PRECISION

Sample IDs: B13IA-2-012817/B13IA-2DUP-012817 (field) Matrix: Air  
 Sample IDs: B13SS-2-012917/B13SS-2DUP-012917 (field) Matrix: Air  
 Sample IDs: B15S-1-012917/B15S-1DUP-012917 (field) Matrix: Air  
 Sample IDs: B15IA-1-012817/B15IA-1DUP-012817 (field) Matrix: Air  
 Sample IDs: LCS/LCSD (laboratory) Matrix: Air

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.  
 Suggested criteria: RPD  $\pm$  50% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

| COMPOUND                                 | SQL   | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION  |
|--|-------|--------------|-----------------|-----|---|
| B13IA-2-012817/B13IA-2DUP-012817 (field) |       |              |                 |     |   |
| Naphthalene                              | 0.060 | 0.029        | ND              | -   | No action, sample/duplicate concentration < 5 x SQL |
| B13SS-2-012917/B13SS-2DUP-012917 (field) |       |              |                 |     |   |
| Naphthalene                              | 2.5   | ND           | 1.7             | -   | No action, sample/duplicate concentration < 5 x SQL |
| B15S-1-012917/B15S-1DUP-012917 (field)   |       |              |                 |     |   |
| Naphthalene                              | 2.5   | 1.7          | ND              | -   | No action, sample/duplicate concentration < 5 x SQL |
| B15IA-1-012817/B15IA-1DUP-012817         |       |              |                 |     |   |
| Naphthalene                              | 0.060 | 0.056        | ND              | -   | No action, sample/duplicate concentration < 5 x SQL |

**Note:** Field duplicates analyzed as part of this data set. Laboratory duplicate were within method performance criteria except for the cases described in this document. No action, sample/duplicate concentration < 5 x SQL

Laboratory duplicates RPD are within method performance criteria.

## DATA REVIEW WORKSHEETS

### Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

## DATA REVIEW WORKSHEETS

All criteria were met   X    
 Criteria were not met  
 and/or see below       

### X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

- \* Area of +40% or -40% of the IS area in the associated calibration standard.
- \* Retention time (RT) within  $\pm 20$  seconds of the IS area in the associated calibration standard.

| DATE | SAMPLE ID | IS OUT | IS AREA | ACCEPTABLE RANGE | ACTION |
|------|-----------|--------|---------|------------------|--------|
|------|-----------|--------|---------|------------------|--------|

Internal standard area and retention times within laboratory control limits for both samples and calibration standards.

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Actions:

**Table 10. Internal Standard Actions for TO-15 Analyses**

| Criteria   | Action                         |                                    |
|--|--------------------------------|------------------------------------|
|  | Detected Associated Compounds* | Non-detected Associated Compounds* |
| Area counts > 140% of CCV or mid-point standard from initial calibration)                            | J-                             | No qualification                   |
| Area counts < 60% of CCV or mid-point standard from initial calibration)                             | J+                             | R                                  |
| Area counts $\geq 60\%$ but $\leq 140\%$ of CCV or mid-point standard from initial calibration)      | No qualification               |                                    |
| RT difference > 20.0 seconds between samples CCV or mid-point standard from initial calibration)     | R*                             |                                    |
| RT difference < 20.0 seconds between samples and CCV or mid-point standard from initial calibration) | No qualification               |                                    |

\* Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

## DATA REVIEW WORKSHEETS

All criteria were met ☒X\_\_\_\_  
Criteria were not met  
and/or see below \_\_\_\_\_

### XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1701454-08A

Naphthalene                      RF = 2.21454

$$[ ] = (21594)(36)/(503464)(2.21454)$$

$$= 0.697 \text{ ng OK}$$

## DATA REVIEW WORKSHEETS

All criteria were met   X    
Criteria were not met  
and/or see below       

### XII. QUANTITATION LIMITS

#### A. Dilution performed

| SAMPLE ID              | DILUTION FACTOR | REASONS FOR DILUTION |
|------------------------|-----------------|----------------------|
| No dilution performed. |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |
|                        |                 |                      |

### System Performance

#### **Action:**

Use professional judgment to qualify the data if it is determined that system performance has degraded during sample analyses. Note, for Laboratory Project Officer (PO) action, any degradation of system performance which significantly affected the data.

#### **Note:**

## DATA REVIEW WORKSHEETS

### **Overall Assessment of Data**

#### **Action:**

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Note, for Laboratory Project Officer (PO) action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

#### **Note:**

Results are valid; the data can be used for decision making purposes.